# SOUTHERN BANKS ISLAND

# WOLF AND CARIBOU SURVEY

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## ABSTRACT

An aerial strip survey was conducted between 19 and 23 March 1993 to estimate wolf numbers and to count and classify Peary caribou. The survey covered a 22 600 $km^2$ area of southern Banks Island and was delineated into three strata based on past wolf harvest/observations and known caribou wintering areas. No wolves were seen during the survey. Hard packed snow conditions prevented observers from seeing any tracks and tracking wolves. No fresh wolf kills were observed and no caribou or muskox were observed being chased by wolves or in an antipredator defense position. One-hundred and six Peary caribou were observed, 23 calves and 83 adults.

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# INTRODUCTION

In 1992 and 1993 residents of Sachs Harbour raised concerns that the wolf population on Banks Island was increasing, and with current low numbers of Peary caribou (Nagy and Fraser unpubl. data), any predation pressure could adversely affect the caribou population. Of the four large mammals on Banks Island (wolves, polar bears, muskox, and Peary caribou) the ecology of the wolf is least known. Information on the status of wolves on Banks Island has been limited to incidental observations by early explorers (Armstrong 1857, Stefansson 1921), short term wildlife inventory surveys (McEwan 1955, Manning and Macpherson 1958, Wilkinson and Shank 1973, Zoltai *et al.* 1980, McLean and Fraser 1992), environmental impact studies related to resource exploration and development (Beak Consultants Limited 1975), and observations of hunters and trappers from Sachs Harbour. From 1955 to 1959, 44 wolves were poisoned on Banks Island by the Canadian Wildlife Service, R.C.M.P. and trappers from Banks Island (Renewable Resources, GNWT files). No wolves were seen on the southern part of the Island in the winter of 1959-60. The number of wolves reported taken during the poisoning period should be considered as a minimum number because trappers may have trapped other wolves and there may have been wolves that were poisoned and not recovered. Unfortunately, biological information was not collected from wolves during the years they were poisoned. In the 1960's and 1970's wolf numbers were believed to be low on Banks Island (Maher 1964; Stephen 1970; Zoltai *et al.*, 1980). During this period trappers felt that wolves might be starving because many white foxes caught in traps were scavenged by wolves.

Peary caribou have been an important food resource for the residents of Banks Island

(Usher 1966), but because of their low numbers in the early 1990's (1000-1200), an annual harvest quota was implemented. In September 1990, following a joint meeting between the Sachs Harbour Hunter's and Trappers Committee (HTC) and the Wildlife Management Advisory Council (NWT), a quota of 150 caribou was adopted by the Sachs Harbour HTC to prevent a further decline in numbers. The quota was further reduced to 30 in 1991 and adjusted to 36 male caribou in 1992 so that there would be one caribou per household.

Wolves have been harvested by local residents since trapping first began on Banks Island. From 1988-90 harvest information was incomplete. The reported annual harvest from 1990-92 was approximately 8 wolves/year (Clarkson unpubl. data; Table 1). However, during the winter of 1992-93, 50 wolves were reported taken (Table 1). This harvest represents a 625% increase from recent years. Therefore, it was important to determine the status of the wolf population on Banks Island.

Wolves are found throughout Banks Island, however, their numbers and densities are unknown. The main objective of this survey was to provide a baseline estimate of wolf numbers and density on the southern half of Banks Island. There are a several methods for estimating wolf densities (Messier and Crête 1987, Gasaway et al. 1983). The most accurate surveys require intensive aerial searching for animals and tracks and are usually aided by having radio-collared wolves (Messier and Crête 1987, Gasaway et al. 1983). There are no wolves on Banks Island equipped with radio-collars. Aerial strip surveys are less accurate (Miller and Russell 1977). Strip surveys with between 11.3 and 17.7% coverage of the area have been used effectively to provide comparative density estimates over successive years for wolves in the Keewatin Region, NWT (Parker 1973). Tener (1963) also successfully used this technique in areas with high

densities of caribou. We used an aerial strip survey technique to estimate wolf numbers. This was the first time an aerial survey of wolves has been conducted on one of the Arctic Islands since Miller and Russell (1977).

# METHODS

The survey was conducted between 19 and 23 March 1993. Prior to starting the aerial survey, we interviewed hunters and trappers to determine where wolves had recently been harvested and/or observed, and to determine which areas were most likely to have a higher density of wolves or caribou. Muskox were considered to be distributed throughout the Island based on the 1992 survey results (Nagy and Fraser unpubl. data). Wolf harvest and observation locations from 1990 to 1993 were collected from interviews with Sachs Harbour HTC members and plotted on 1:250 000 maps. A four hour reconnaissance flight was flown to identify caribou wintering areas and verify our preliminary stratification of the study area.

A 22 600 $km^2$ survey area was delineated on the southern part of Banks Island after the reconnaissance flight (Figure 1). The survey area was stratified into high, medium, and low density areas, of 4166 $km^2$, 6205 $km^2$, and 12 289 $km^2$, respectively, based on past wolf harvest and observation information and known caribou wintering areas (Figure 2). Percent coverage of the areas surveyed was high - 100, medium - 26.3, and low - 14.7. Parallel transects were flown at approximately 4 km intervals in the high density stratum, 8 km intervals in the medium density stratum, and 15 km in the low density stratum (Appendix B). All transects were flown at 150 m above ground level (agl) and at an airspeed of 160 km/h. The aircraft was able to follow exact transects with the assistance of a Global Positioning System (GPS)(Trimble TranspakII). Two observers were positioned on either side in the rear of the aircraft, and a third observer in the copilot seat. The pilot also searched for wolves and caribou, however, his main task was to ensure the aircraft remained on transect. The struts of the Cessna 185 were marked so that 2

transect widths were available: one for days or areas with high visibility (2.1 km) and another for days or areas with low visibility (1.3 km) (Norton-Griffiths 1978). The low visibility transect widths were not used during the survey.

When wolves or caribou were observed the location (GPS), number, sex and age class in the group was recorded. When classifying animals it was often necessary to veer off the transect line. Once the animals were classified, the plane returned to the transect. Any caribou sighted off the transect were classified and their location recorded, but they were not included in the caribou population estimate.

Adverse weather conditions prevented coverage of 5039 $km^2$ in the low density stratum (Figure 3). All high and medium density strata were surveyed.

# RESULTS

## Wolves

No wolves were seen during the survey. Hard packed snow conditions prevented observers from seeing any wolf tracks. No fresh wolf kills were observed.

## Peary caribou

One-hundred and six Peary caribou were observed: 53 in the high density stratum, 51 in the medium density stratum (37 on transect and 14 off transect), and 2 (both on transect) in the low density stratum (Figure 4). Following the Jolly (1969) method, and using only those animals observed on transect, we calculated a population estimate of 208 caribou $\pm$ 21.3 S.E.

Twenty-three of the 106 Peary caribou were calves. Of the remaining 83 adult caribou 23 were males, 44 were females, and 16 were unclassified adults. The calf:adult female ratio of this sample was at least 38 calves per 100 adult females (all unclassified adults assumed females), but no higher than 52 calves per 100 adult females (all unclassified adults assumed as males).

# DISCUSSION

## Wolves

The distribution and low densities of wolves create most of the variability in aerial surveys (Caughley 1974). Miller and Russell (1977) successfully observed wolves on snow covered tundra using 0.8 km strip transects on either side of the aircraft. Our transects were of comparable width. In the high density strata, flown at 100% coverage, wolves were not observed, however, arctic foxes, arctic hares, ptarmigan, and snowy owls were observed. It is unlikely that wolves were missed by the observers. Wolves may have been present and not observed in medium and low density strata. Hard windswept snow precluded tracking in all strata. Wolves are present on the northern part of Banks Island (J. Lucas Sr. pers. comm. 1993), but their numbers were not determined from this survey.

Subsequent to the survey 3 sets of tracks were observed on the southern part of the Island during muskox sport hunting in April (D. Nasogaluak Jr. pers. comm. 1993). Two wolves (male and female) were harvested in the Kellett River area east of Sachs Harbour (1 May 1993), and 3 adult wolves were seen near the Big River area east of Sachs Harbour (August 22, J. Lucas Sr. pers. comm.). Residents of Sachs Harbour think that a female wolf is still in the area near the hamlet. It is not possible to determine if these wolves were in the area during the survey or have moved down from the north since the survey.

Although, Miller (1992) proposed that the wolf population on Banks Island should be approximately 900 animals, based upon available prey biomass (Keith 1983), the general consensus among biologists was that the wolf population was likely much lower. The results of

this survey lend support the latter. There are possibly wolves on southern Banks Island, however, their numbers appear to be extremely low. Numbers of wolves on the northern part of the Island are unknown; 18 of the 50 wolves harvested by residents of Sachs Harbour were taken from the northern end.

Peary caribou

Although the initial objective was to determine the number of wolves on the southern part of the Island, the survey design permitted an estimate of the Peary caribou population in the area. The estimate of 208 Peary caribou from this survey is much lower than the island-wide estimate of 988 $\pm$ 131 S.E. (calves excluded from the estimate) and 1432 $\pm$ 188 S.E. (calves included in the estimate), in August 1992 (Nagy and Fraser unpubl. data). The lower caribou estimate would be expected because: i) the survey area covered only 25% of the southern half of Banks Island, ii) strata were defined by wolf and prey abundance, not solely by expected caribou abundances, and iii) part of the low density area that was not surveyed because of adverse weather conditions is considered traditional caribou wintering grounds.

In a classification survey conducted in August 1992, Nagy and Fraser (unpubl. data) found calves accounted for 30.4% of all classified caribou (n=191), and calculated a calf:adult female ratio of 67.4 calves per 100 adult females. Data from the caribou population census, also conducted in August, show that calves represented 30.9% of all classified caribou (n=282) (Nagy and Fraser unpubl. data). Calves represented 21.7% of the caribou seen in this survey.

# RECOMMENDATIONS

1) Continue to monitor the wolf harvest on Banks Island by collecting the following information and samples: the number and location, the sex, the skulls for cementum annuli analysis of teeth, and the carcasses to determine diet from stomach and intestine contents.

2) Continue to collect wolf related information including: sightings, den sites, kill sites, wolf scats, and tracks.

3) Continue to collect long bones, and/or jaw bones from kill sites in order to determine the prey type, age and an index of its physical condition.

## ACKNOWLEDGEMENTS

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## PERSONAL COMMUNICATIONS

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Nasogaluak Jr., David, Resident hunter and trapper, Sachs Harbour, N.W.T.

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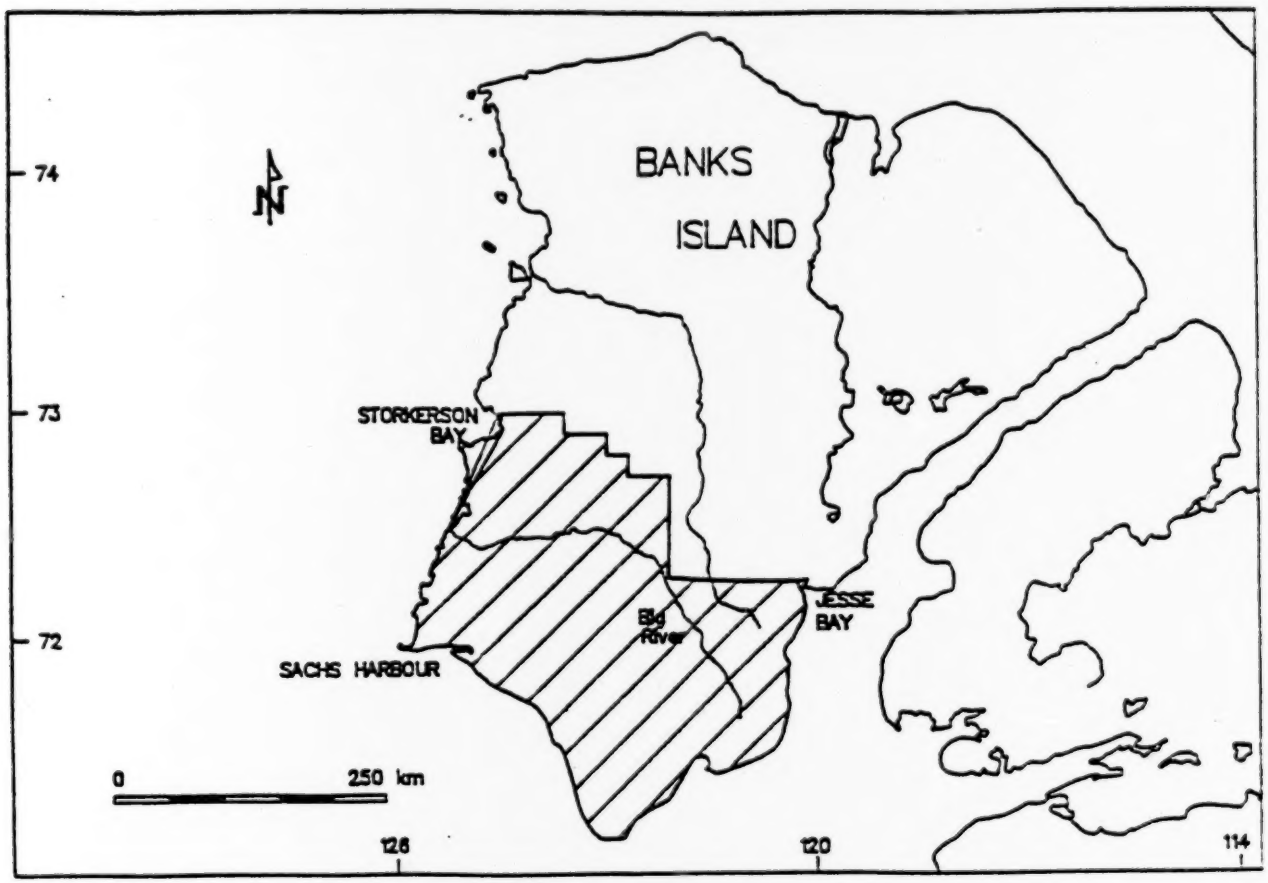


Figure 1. The survey area on Banks Island.

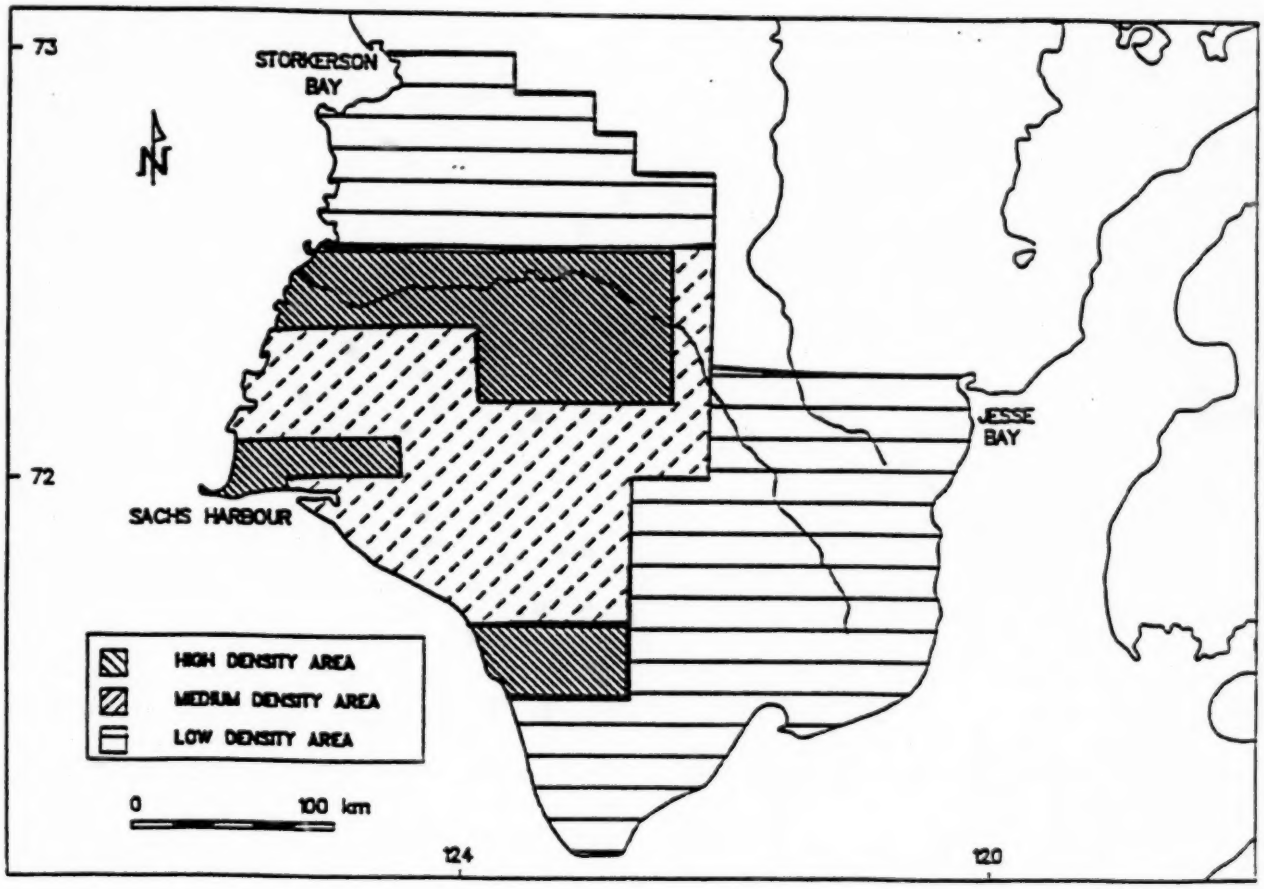


Figure 2. The areas of high, medium, and low density strata.

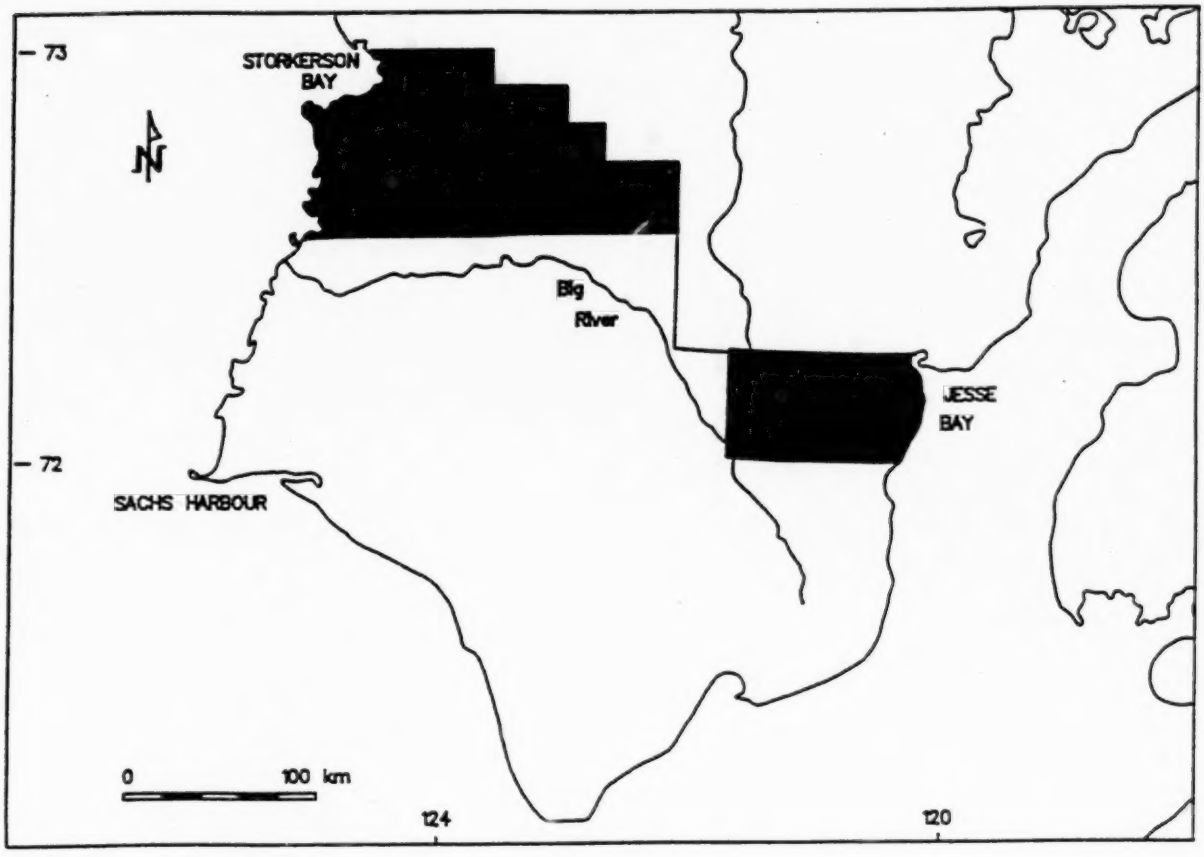


Figure 3. Parts of the low density stratum that were not surveyed.

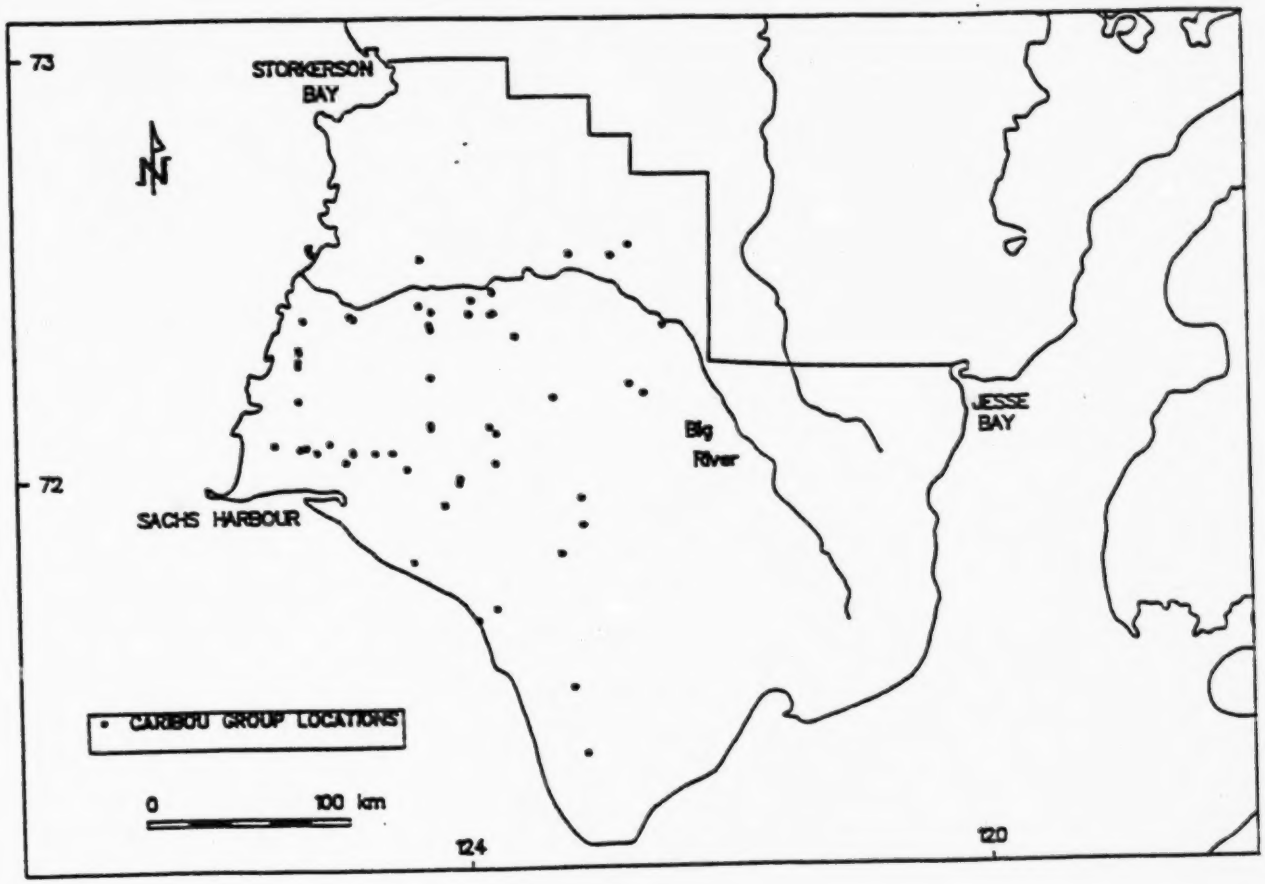


Figure 4. Locations of caribou groups observed on the survey.

Table 1. Wolf harvest information collected on Banks Island from 1989 to 1993.[1]

| | Sex | | | | Age Class[2] | | | |
|---|---|---|---|---|---|---|---|---|
| Year[3] | M | F | unk | total | <1 year | 1 to 1.75 years | >1.75 years | unk |
| 1988/89 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 1989/90 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 1990/91 | 5 | 2 | 0 | 7 | 0 | 4 | 3 | 0 |
| 1991/92 | 2 | 0 | 7 | 9 | 0 | 0 | 2 | 7 |
| 1992/93 | 12 | 3 | 35 | 50 | 16 | 12 | 10 | 12 |

[1] Data from skulls and carcasses purchased from hunters and trappers by the Department of Renewable Resources, Inuvik, Northwest Territories.

[2] Wolf ages were determined from the number of cementum annuli in the root of the premolar (Matsons Laboratory, Milltown, Montana).

[3] Based upon licence year

APPENDIX A. Transect lengths and the number of caribou seen on and off transect, for medium and low density strata. High density strata totals are subdivided by block (see text for block location). Female and male classification are for adult animals. Adult classification means the sex was not determined.

| Transect | Strata | Length (km) | On | Off | Classification |
|---|---|---|---|---|---|
| 1 | L | 23.25 | 0 | 0 | |
| 2 | L | 15.25 | 0 | 0 | |
| 3 | L | 49.88 | 1 | 0 | Female (1) |
| 4 | L | 61.01 | 0 | 0 | |
| 5 | L | 13.25 | 0 | 0 | |
| 6 | L | 78.25 | 0 | 0 | |
| 7 | L | 81.75 | 0 | 0 | |
| 8 | L | 80.25 | 0 | 0 | |
| 9 | L | 78.50 | 1 | 0 | Male (1) |
| 10 | L | 14.75 | 0 | 0 | |
| 11 | L | 14.25 | 0 | 0 | |
| 12 | M | 18.25 | 0 | 0 | |
| 13 | M | 30.00 | 0 | 0 | |
| 14 | M | 30.00 | 12 | 0 | Calf (2), Female (2), Male (1), Adult (7) |
| 15 | M | 16.25 | 0 | 0 | |
| 16 | M | 30.00 | 2 | 0 | Male (2) |
| 17 | M | 23.00 | 0 | 0 | |
| 18 | M | 30.00 | 6 | 0 | Female (4), Male (2) |
| 19 | M | 50.00 | 0 | 1 | Male (1) |
| 20 | M | 70.50 | 5 | 3 | Calf (2), Female (2), Male (1), Adult (3) |
| 21 | M | 79.25 | 0 | 7 | Calf (3), Female (2), Male (2) |
| 22 | M | 60.00 | 9 | 0 | Calf (4), Female (2), Male (3) |
| 23 | M | 60.00 | 0 | 0 | |
| 24 | M | 60.00 | 3 | 1 | Calf (2), Female (1), Male (1) |
| 25 | M | 60.00 | 0 | 2 | Female (2) |
| 26 | M | 60.00 | 0 | 0 | |
| 27 | M | 20.00 | 0 | 0 | |
| 28 | M | 20.00 | 0 | 0 | |
| 29 | M | 20.00 | 0 | 0 | |
| 30 | M | 10.00 | 0 | 0 | |
| 31 | M | 10.00 | 0 | 0 | |
| 32 | M | 10.00 | 0 | 0 | |
| 33 | M | 14.00 | 0 | 0 | |
| Total | | 1291.64 | 39 | 14 | Calf (13), Female (16), Male (14), Adult (10) |

| Block | Strata | Area (sq. km) | | | Classification |
|---|---|---|---|---|---|
| 1 | H | 2903.15 | 32 | 0 | Calf (6), Female (21), Male (4), Adult (1) |
| 2 | H | 757.28 | 20 | 0 | Calf (3), Female (7), Male (5), Adult (5) |
| 3 | H | 764.74 | 1 | 0 | Calf (1) |
| Total | | 4425.17 | 53 | 0 | Calf (10), Female (28), Male (9), Adult (6) |
| Grand Total | | | 92 | 14 | Calf (23), Female (44), Male (23), Adult (16) |

APPENDIX B. Transect lines flown in the medium and low density strata.